

## CONFIGURABLE MANNEQUIN FORM

## CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application is a continuation in part application of U.S. Application Serial No. 10/330,922 filed on December 27, 2002 and entitled Automated Process for the Production of Garments, the contents of which are incorporated herein by reference.

## BACKGROUND OF THE INVENTION

1. Field of the Invention

[0002] The present invention relates generally to mannequin forms. More particularly, the present invention relates to configurable mannequin forms.

2. Description of Related Art

[0003] Mannequin forms for displaying garments in stores are common. Such display type mannequin forms are typically made of molded plastic. Here, the various portions of the mannequin form, such as the head, arms, legs, can be moved to simulate one or more body positions to best display the particular garment. However, the size of these mannequin forms is typically not adjustable.

[0004] Mannequin forms for use in the manual production of garments are also common. This type of mannequin form is typically adjustable in size and/or shape to assist the

user in producing finished garments of various sizes. However, this type of mannequin form typically has a cloth or fabric outer layer, which facilitates receipt of pins and needles during the garment production.

**[0005]** It has been determined by the present invention that the aforementioned prior mannequin forms are not suitable for the rigors of automated production processes. Thus, it has been determined that there is a need for configurable mannequin forms suited for use in the automated production of garments.

#### SUMMARY OF THE INVENTION

**[0006]** It is an object of the present invention to provide a configurable mannequin form.

**[0007]** It is another object to provide a configurable mannequin form suitable for the automated production of garments.

**[0008]** These and other objects and advantages of the present invention are provided by a mannequin form having a first section and a second section made of one or more selected materials. The selected materials resist damage from one or more stresses that can be caused by heating, cutting, dying, or any combinations thereof. The first section is releasably secured to the second section to define a predetermined three-dimensional shape. The first and second sections abut at a first smooth mating line.

[0009] These and other objects and advantages of the present invention are also provided by a mannequin form having a first metallic section, a second metallic section, and a fourth metallic section. The metallic sections are magnetically securable to one another to define a smooth outer shape.

[0010] The above-described and other features and advantages of the present invention will be appreciated and understood by those skilled in the art from the following detailed description, drawings, and appended claims.

#### BRIEF DESCRIPTION OF THE DRAWINGS

[0011] FIG. 1 is a schematic depiction of an exemplary embodiment of a configurable mannequin form in use with an automated process;

[0012] FIG. 2 is a front perspective view of the configurable mannequin form of FIG. 1;

[0013] FIG. 3 is a first exploded perspective view of an alternate embodiment of a configurable mannequin form;

[0014] FIG. 4 is a second exploded perspective view of the configurable mannequin form of FIG. 3;

[0015] FIG. 5 is an exploded perspective view of a portion of the configurable mannequin form of FIG. 3; and

[0016] FIG. 6 is an exploded perspective view of another alternate exemplary embodiment of a configurable mannequin form.

#### DETAILED DESCRIPTION OF THE INVENTION

[0017] Referring to the drawings and in particular to FIG. 1, a configurable mannequin form generally represented by reference number 10 is illustrated. Mannequin form 10 can have a three-dimensional shape replicating one or more portions of a human body. For example, mannequin form 10 can have a three-dimensional shape representing an upper torso or chest region as shown in FIG. 1.

[0018] Advantageously, mannequin form 10 is configurable to any desired size and/or shaped. In addition, mannequin form 10 can be configured to absorb the stresses applied by the automated production of garments.

[0019] Mannequin form 10 is illustrated in FIG. 1 in use with an automated process 12. Process 12 can include any number stations, which perform manufacturing steps to produce a finished garment (not shown). It has been found that each station or manufacturing step of process 12 places a different type of stress on mannequin form 10.

[0020] In the illustrated embodiment, process 12 is illustrated having a first station 14, a second station 16, a third station 18, a fourth station 20, a fifth station 22, and a sixth station 24. Mannequin form 10 is detachably or removably mountable on a conveyor 26, which

moves the mannequin form through one or more of the first through the sixth stations, respectively.

[0021] During process 12, mannequin form 10 is loaded with a garment blank 28 at the first station 14. The loaded mannequin form 10 is then sequentially moved by conveyor 26 to each of the stations. Once mannequin form 10 has traversed the desired stations of process 12, blank 28 in a finished or substantially finished form is removed at sixth station 24.

[0022] It has been found that mannequin form 10 having an outer shape free of rough edges, discontinuities, or gaps between parts (hereinafter "smooth") is well suited for automated process 12. For example, the smooth outer surface of mannequin form 10 assists the loading and/or unloading blank 28 at first and sixth stations 14, 24, respectively.

[0023] At second station 16, blank 28 is heat set to a desired shape. Since mannequin form 10 has a predetermined shape, heat applied at second station 16 can set the shape of blank 28 to the shape of the mannequin form. In addition, cooling of blank 28 after the application of heat can, in some fabrics, further set the shape of the blank.

[0024] It has also been found that the smooth outer surface of mannequin form 10 ensures that the heat setting of blank 28 at second station 16 provides the garment with the desired shape. For example, the smooth outer surface

of mannequin form 10 ensures that no ridges or bumps are heat set into blank 28 by second station 16.

[0025] Third station 18 trims one or more regions from blank 28 to define the periphery of the finished garment. For example, third station 18 can trim blank 28 through the application of heat to separate heat degradable yarns incorporated in the blank. Third station 18 can trim blank 28 by physically severing the fabric of the blank by, for example, a blade compressed against mannequin form 10. Alternately, third station 18 can impinge an ultrasonic or laser on blank 28 to sever blank 28.

[0026] At fourth station 20, one or more components are applied to blank 28. Blank 28 can require additional garment parts, such as, for example, shoulder straps, and connecting devices. At fourth station 20, additional components are secured to blank 28 while on mannequin form 10. The additional components can be positioned on blank 24 by a computer controlled robotic arm and then secured to the blank by, for example, welding (heat or ultrasonic), fusing, the application of adhesives, or any combinations thereof.

[0027] Fifth station 22 can provide blank 28 with a desired color and/or pattern. For example, fifth station 22 can apply a dye or other coloring agent in a selected pattern to blank 28. The dye or other coloring agent can be applied using, for example, a spraying technique, a rolling technique, an immersion technique, and other conventional application techniques.

[0028] It has also been found advantageous for mannequin form 10 to be made of one or more materials that are: resistant to heat applied by second station 16, multiple cutting cycles of third station 18, the connecting of parts at fourth station 20, and the dyes applied by fifth station 22. For example, it is contemplated that mannequin form 10 be made of a metal material such as, but not limited to, steel, aluminum, or alloys thereof. Of course, it is also contemplated that mannequin form 10 be made of polymeric materials, such as, but not limited to, acrylic materials.

[0029] Thus, mannequin form 10 is hard enough to resist damage during heating of blank 28, cutting of the blank, and can be easily cleaned of any residue left by process 12, such as adhesives, dyes, and/or melted portions of the blank.

[0030] In addition, it has been found that setting of dyes or other coloring agent applied at fifth station 22 can be adversely affected by the thermal properties of mannequin form 10. For example, fifth station 22 can include a steam chamber (not shown) for exposing mannequin form 10 to a supply of steam or other heated gas for affixing the dyes and coloring agents to the fabric of blank 28. It has been found that this steam can condense on the surface of mannequin form 10, which forms areas of uneven color.

[0031] Advantageously, mannequin form 10 has thermal properties sufficient to resist and/or mitigate formation

of condensation when steam is applied. For example, the materials and thickness of these materials are selected to mitigate condensation on the steam at fifth station 22. Thus, mannequin form 10 is also heat resistant enough to resist and/or mitigate the formation of condensation during steaming of blank 28.

**[0032]** Referring to FIG. 2, an exemplary embodiment of mannequin form 10 that is configured to meet the different types of stresses applied by process 12 is shown. Mannequin form 10 has a first section 30 and a second section 32. First section 30 approximates the three dimensional shape of the chest, while second section 32 approximates the three dimensional shape of the back.

**[0033]** First and second sections 30, 32 are releasably securable to one another. First and second sections 30, 32 define a smooth mating line 34 where the first and second sections abut one another. Thus, sections 30, 32 provide mannequin form 10 with the desired three-dimensional shape of an upper torso or chest region when secured to one another. Preferably, smooth mating line 34 is along the entire periphery where first and second sections 30, 32 mate with one another.

**[0034]** First section 30 can have a third section 36 of a desired size. In the illustrated embodiment, third section 36 is a breast region or section. Third section 36 can be integrally formed with first section 30. Alternately, third section 36 can be removably secured to first section 30 along a smooth mating line (not shown), which allows

further configuration of mannequin form 10. Thus, removable third section 36 can allow for configuration, as desired, of the breast cup size of mannequin form 10.

[0035] Mannequin form 10 can include one or more fourth sections 38. Fourth section 38 is releasably securable between first and second sections 30, 32 at a pair of smooth mating lines 34 as shown in FIGS. 3 and 4. Thus, fourth section 38 also allows for further configuration of the torso circumference of mannequin form 10.

[0036] Sections 30, 32, 36, 38 are releasably securable to one another so that mating lines 34 remain smooth when mannequin form 10 is subjected to the stresses of process 12. In the illustrated embodiment, sections 30, 32, 36, 38 can be releasably securable to one another by way of a number of magnets 40.

[0037] Thus, mannequin form 10 can quickly and easily be configured, as desired, by selecting the desired sections and securing them to one another. Advantageously, the configuration of mannequin form 10 allows process 12 to be changed from manufacturing blanks having a first size to blanks having a different size. Thus, mannequin form 10 can reduce the changeover time needed to change process 12 from size-to-size as compared to previous systems.

[0038] Preferably, the sections 30, 32, 36, 38 of mannequin form 10 can nest with one another to maximize storage efficiency. An exemplary embodiment of nesting is illustrated in FIG. 5 with respect to first section 30

having integral third section 36. Here, first section 30 defines an inner cavity 42. Inner cavity 42 of each first section 30 has a size that is sufficient to receive a second first section 30. Thus, cavity 42 allows a number of first sections 30 to be nested together to maximize storage efficiency.

[0039] It should be recognized that this nesting is illustrated with respect to first section 30 nesting with another first section for purposes of clarity only. Of course, it is contemplated by the present invention that any section 30, 32, 36, 38 of mannequin form 10 can nest with each other.

[0040] It should also be recognized that mannequin form 10 is illustrated in FIGS. 1 through 5 by way of example having a three-dimensional shape representing an upper torso or chest region. Of course, it is contemplated by the present invention for mannequin form 10 to have another three-dimensional shape, such as, but not limited to, a leg, a lower torso or waist region, a head, an arm, a hand, a foot, or any combinations thereof.

[0041] For example, an alternate exemplary embodiment of a mannequin form 110 having a three-dimensional shape representing a lower torso is illustrated in FIG. 6. Here, components having similar or analogous features are numbered in multiple of one hundred. Mannequin form 110 includes a first section 130, a second section 132, an optional third section 136, and an optional fourth section 138. The sections 130, 132, 134, 136 of mannequin form 110

are connectable along one or more mating lines 134. In the illustrated embodiment, third section 136 is a gluteus region, which can be integrally with or releasably securable to first section 130.

**[0042]** It is noted that the terms "first", "second", "third", "upper", "lower", and the like may be used herein to modify various elements. These modifiers do not imply a spatial, sequential, or hierarchical order to the modified elements unless specifically stated.

**[0043]** While the present disclosure has been described with reference to one or more exemplary embodiments, it will be understood by those skilled in the art that various changes may be made and equivalents may be substituted for elements thereof without departing from the scope of the present disclosure. In addition, many modifications may be made to adapt a particular situation or material to the teachings of the disclosure without departing from the scope thereof. Therefore, it is intended that the present disclosure not be limited to the particular embodiment(s) disclosed as the best mode contemplated, but that the disclosure will include all embodiments falling within the scope of the appended claims.